

Presentation at the conference *Harnessing Advanced Technology For C4ISTAR*

C4 Challenges in Swedish Defence Doctrine and Programmes

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1. Introduction

Since the world situation switched from the Cold War to the “Hot Peace” the SwAF roles changes a lot. Formerly its main task was to fight against any invader of our country. Now, we do not assess the risk of being invaded to be very large. Instead the SwAF have been given four main tasks which causes the need for changes.

They are the ability

- to withstand Armed Attacks
- to defend Territorial Integrity
- to participate in International Operations (peace keeping)
- to strengthen the Civil Society in Crises.

This added with new technical possibilities has given birth to the expression “New Ways of Fighting Wars”.

2. The New Way of Fighting Wars

Like most other western countries we influenced by RMA, Revolution in Military Affairs. The idea is to win the battle by having a decision loop that is faster than the enemy's. This is accomplished by means of a good situation awareness, an efficient command and control system and the ability to have fire power at the right place. The situation awareness and the efficient C2 system are the key factors, but how can they be accomplished? The solution is called Network Centric Warfare. By connecting sensors, C2 system and warfighters to a network similar to Internet all relevant information have the potential to be at the right place at the right time. Simple, is it not?

3. The Challenges

The challenges are related to the sensor systems, the communication systems and the information processing systems.

Sensor Challenges are

- to detect/classify/identify stealthy targets
- to detect/classify/identify ground targets that are hidden and/or moving
- to be able to constantly survey the ground, air and waters around our country.

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Major challenges related to Information processing are:

- multi sensor and multi media fusion
- information fusion
- selection, distribution, presentation of information
- interoperability
- information assurance.

4. C4 research at FOI

To meet the needs for *know how* arisen by the plans for Network Centric Warfare, FOI has divided the C4 research into five major areas:

- decision support
- valuation
- information assurance/IT security
- telecommunication
- over all view.

Within the Decision Support area some projects are of a very technical nature, while most of them addresses problems related to humans in the loop. Typical research issues are

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- information fusion
- interaction between staffs and between people in them
- decision making mechanisms
- presentation technologies
- information trust

A lot of research regarding presentation techniques is made by the Swedish Defence Collage in collaboration with FOI. Two major projects, worth to mention, are under way, AQUA, which deals with display techniques preferably 3D and ROLF, which deals with movable operational command and related problems.

The New Swedish defence will be built up in an evolutionary way. This means that many small steps will be taken rather than a giant leap. Every step has to be evaluated, though. The loop will roughly look as follows: (remember that we are talking of C3I systems)

- new method or technology etc. is suggested
- modelling
- training
- testing
- evaluating
- deduction
- implementing/not implementing
- new method...

Today, when new methods etc. are tested, the whole procedure can well take a year or even more. That will have to be changed in the future. The methodology to shorten this process to months or even weeks, has already started to be developed at FOI. For example the MIND system, which is a fully automated logging system, is used at larger exercises. It has the capability of giving feed back in a few hours. Thus the participants can be briefed while they still remember how they experienced the course of events.

There is a need for more logging systems like that, where you can actually measure the human behaviour, amongst others.

Within the IA/IT security area the following activities are going on at FOI.

- A virus lab or rather a IT weapons lab is under development. It will be used to test hostile code in a contained environment. It will among other facilities have an incident data base.
- Different languages supporting mobile code are investigated with respect to security. Also the use in different environment is investigated.
- Authentication and authorisation methods are investigated/ tested/ developed especially for mobile nodes that come and go.
- Usable methods of quantifying security of information are investigated. The objective is to give the receiver a notion of how well he/she can trust incoming information.

Within the communication area the major projects are

- “Communication channel”, which deals with what's happening between the antennas. Wave propagation models have been developed into 3D ray tracing models for prediction purposes.
- “Communication link”, which is addressing the problems related to electronic warfare, that is, how to avoid being jammed and being detected (robustness and stealth). It also deals with unintentional jamming of Your own equipment by Your own equipment. Technologies investigated are electri-cal steerable antennas, modern band spreading techniques etc.
- “Ad hoc mobile networks”, which deals with problems connected to multi hop techniques, quality of service etc.

“TRAN” Tactical Radio Access Network is a just now somewhat resting project. It has dealt with questions around using 3G for military mobile purposes.

Last but not least there is a need for an over all view of a C3I system.

For the moment we have chosen to address problems related to the need for a flexible structure/organisation. How can a staff be organised according to what's needed for this actual task.

Another research project, which objectives are to answer questions related to interaction between the civil society different organs and the military different organs. Co-operation must be possible at all levels dependent of the nature of the crisis. This can be anything from snow blizzards to a real war.

The interaction is affected by many surrounding factors such as needs, laws, organisations etc., which have to be taken into account.

5. Conclusions

In the rapidly changing Swedish Defence the challenges are enormous and to meet up to them is virtually impossible.

We are working with issues that we feel are most important. This is also dependent on what kind of resources we have i.e. the scientists themselves. But most of the knowledge needed we will have to find somewhere else which means open sources. At FOI, we already participate in a lot of collaboration projects with other countries. This is something we would like to extend.

A few more three letter acronyms will end this presentation.

VAT everyone knows the meaning: Value Added Taxes.

VAR would then be: Value Added Research. One plus one equals two, at least! For all parties!

So, we are open to any suggestion of collaboration that may have evolved from this presentation.

If You want some more information about this topic, I suggest that You visit these web addresses:

FOI - www.foi.se

SWAF - www.mil.se

FMV - www.fmv.se